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PROVISIONAL SPECIFICATION

Improvements in or relating to the Production of Tablets, Pellets or Briquettes

I, HORACE INGLESON, a British subject, of the Water Pollution Research Laboratory, Langley Road, Watford, in the County of Hertfordshire, do hereby declare the nature of this invention to be as follows:—

It is often necessary to add solid, powdery or granular substances to liquids such as water. In order to reduce materially the volume of packing space occupied by such powdery materials or to aid in controlling the dosage it is often desirable to form the loose material into a compact mass by application of pressure in some form of mould or die thereby producing a tablet, pellet or briquette, but the successful and convenient use of such solid compacted materials when added to the liquid is generally dependent upon the rapid and complete disintegration of the tablet or the like into a finely divided condition.

Some materials when in compacted form do not however disintegrate readily on being placed in certain liquids, and the object of the invention is to overcome this difficulty, particularly in the case of natural waters, including highly saline waters, aqueous solutions of salts, and mixtures of water with other liquids, for example alcohol. According to my invention a small porportion of bentonite, fullers earth, or other substance having similar properties of swelling when wetted,

is added to the powdery materials before they are formed into a compacted mass by application of pressure. I have found that rapid, certain and complete disintegration of the tablet pellet or briquette is thereby ensured.

Particular fields of application of my invention are the treatment of highly saline waters, for example, sea water or brackish waters, by solids in compacted form whereby undesirable constituents are removed rendering the water potable, and the treatment of potable water by solids in compacted form whereby beneficial or medicinal properties are imparted to the water.

My invention may be illustrated by the following example:—

Six batches of powder were prepared of the following composition:—18.5 grams of a silver zeolite, 1.3 grams of powdered silver oxide, 1.25 grams of barium chloride. To each of two of these batches, numbered 2 and 6 in the subjoined table, 1 gram of bentonite was added and thoroughly mixed with the other constituents. The six batches of powder were then formed into small briquettes or tablets by application of hydraulic pressure in a steel die. In the table the pressure applied in compacting the powder and the behaviour of the briquettes when immersed in sea water are set out.

TABLE SHEWING THE EFFECT OF ADDITION OF BENTONITE
TO POWDER USED IN MAKING BRIQUETTES

| Briquette No. | Pressure applied in making briquette (tons per sq. in.) | Behaviour of briquette on immersion in sea water without shaking |
|---------------|---|---|
| 1 | 3.6 | Air bubbles evolved; no sign of disintegration after 42 hours continuous immersion. |
| 2 | 3.6 | Air bubbles evolved; disintegration began after 30 to 60 seconds immersion. |

| | Briquette No. | Pressure applied in making briquette (tons per sq. in.) | Behaviour of briquette on immersion in sea water without shaking |
|----|---------------|---|---|
| 5 | 3 | 5.4 | Air bubbles evolved; no sign of disintegration after 42 hours continuous immersion. |
| | 4 | 7.2 | Air bubbles evolved; no sign of disintegration after 42 hours continuous immersion. |
| 10 | 5 | 9.1 | Air bubbles evolved; no sign of disintegration after 42 hours continuous immersion. |
| 15 | 6 | 9.1 | Air bubbles evolved; disintegration began after about 60 seconds' immersion. |

Dated the 3rd day of October, 1942.

H. K. WARR-LANGTON,
Agent for the Applicant.

COMPLETE SPECIFICATION

Improvements in or relating to the Production of Tablets, Pellets or Briquettes

I, HORACE INGLESÓN, a British subject, of the Water Pollution Research Laboratory, Langley Road, Watford, in the County of Hertfordshire, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

It is often necessary to add solid, powdery or granular substances to liquids such as water. In order to reduce materially the volume of packing space occupied by such powdery materials or to aid in controlling the dosage it is often desirable to form the loose material into a compact mass by application of pressure in some form of mould or die thereby producing a tablet, pellet or briquette, but the successful and convenient use of such solid compacted materials when added to the liquid is generally dependent upon the rapid and complete disintegration of the tablet or the like into a finely divided condition.

Some materials when in compacted form do not however disintegrate readily on being placed in certain liquids, and the object of the invention is to overcome this difficulty, particularly in the case of natural waters, including highly saline waters, aqueous solutions of salts, and mixtures of water with other liquids, for example alcohol. According to my in-

vention a small proportion of bentonite or fuller's earth is admixed with the powdery or granular materials before they are formed into a compacted mass by application of pressure. Such substances are insoluble but have the property of swelling when wetted and I have found that rapid, certain and complete disintegration of the tablet pellet or briquette is thereby ensured. A suitable proportion of bentonite is of the order of 5 per cent by weight, and of fuller's earth $7\frac{1}{2}$ per cent. A further advantage of these substances is that they do not produce colloidal suspensions which would be impossible to filter at a later stage as is the case with gum and the like materials.

Particular fields of application of my invention are the treatment of highly saline waters, for example, sea water or brackish waters, by solids in compacted form whereby undesirable constituents are removed rendering the water potable, and the treatment of potable water by solids in compacted form whereby beneficial or medicinal properties are imparted to the water. A suitable composition for use in rendering sea water potable may comprise mainly silver zeolite, together with small proportions of silver oxide, an alkaline earth compound, and the swelling agent.

My invention may be illustrated by the following examples:—

EXAMPLE A.

Six batches of powder were prepared of the following composition:—18.5 grams of a silver zeolite, 1.3 grams of powdered silver oxide, 1.25 grams of barium chloride. To each of two of these batches, numbered 2 and 6 in Table A, 1 gram of bentonite was added and thoroughly

mixed with the other constituents. The six batches of powder were then formed into small briquettes or tablets by application of hydraulic pressure in a steel die. In Table A the pressure applied in compacting the powder and the behaviour of the briquettes when immersed in sea water are set out.

TABLE A.

EFFECT OF ADDITION OF BENTONITE TO POWDER USED IN MAKING BRIQUETTES

| Briquette No. | Pressure applied in making briquette (tons per sq. in.) | Remarks | Behaviour of briquette on immersion in sea water without shaking. |
|---------------|---|-------------------|---|
| 1 | 3.6 | No bentonite used | Air bubbles evolved; no sign of disintegration after continuous immersion for 42 hours. |
| 2 | 3.6 | Bentonite used | Air bubbles evolved; disintegration began after immersion for 30 to 60 seconds. |
| 3 | 5.4 | No bentonite used | Air bubbles evolved; no sign of disintegration after continuous immersion for 42 hours. |
| 4 | 7.2 | No bentonite used | Air bubbles evolved; no sign of disintegration after continuous immersion for 42 hours. |
| 5 | 9.1 | No bentonite used | Air bubbles evolved; no sign of disintegration after continuous immersion for 42 hours. |
| 6 | 9.1 | Bentonite used | Air bubbles evolved; disintegration began after immersion for about 60 seconds. |

EXAMPLE B.

Eight batches of powder were prepared of the following composition:— 18.5 grams of a silver zeolite, 0.1 gram of powdered silver oxide, 1.02 grams of barium monoxide. To each of the batches, numbered 2, 4, 6 and 8 in Table B, 1.5 grams of fuller's earth was added and thoroughly mixed with the other

constituents. The eight batches of powder were then formed into small briquettes or tablets by application of hydraulic pressure in a steel die. In Table B the pressure applied in compacting the powder and the behaviour of the briquettes when immersed in sea water are set out.

TABLE B.
EFFECT OF ADDITION OF FULLER'S EARTH TO POWDER USED
IN MAKING BRIQUETTES

| Briquette No. | Pressure applied in making briquette (tons per sq. in.) | Remarks | Behaviour of briquette on immersion in sea water without shaking. |
|---------------|---|------------------------|---|
| 1 | 3.6 | No fuller's earth used | Slight initial evolution of gas, no disintegration after immersion for 16 hours. |
| 2 | 3.6 | Fuller's earth used | Gas evolved; briquette became soft mass within 1 minute. |
| 3 | 7.2 | No fuller's earth used | Slight initial evolution of gas, no disintegration after immersion for 16 hours. |
| 4 | 7.2 | Fuller's earth used | Gas evolved: briquette expanded and became soft mass within 1 minute. |
| 5 | 10.9 | No fuller's earth used | Slight initial evolution of gas, no disintegration after immersion for 16 hours. |
| 6 | 10.9 | Fuller's earth used | Brisk effervescence and rapid swelling of briquette; briquette crumbled to slurry within 1 minute. |
| 7 | 13.6 | No fuller's earth used | Slight initial evolution of gas, no disintegration after immersion for 16 hours; briquette split into two parts which did not disintegrate. |
| 8 | 13.6 | Fuller's earth used | Brisk effervescence and rapid swelling of briquette; briquette crumbled to slurry within 1 minute |

It should be mentioned that it is proposed in Patent Specification No. 501,960 to prepare a composition suitable for the preparation of insecticidal spray emulsions comprising dinitrocyclohexylphenol and a gel-forming clay, particularly bentonite, by stirring 5 to 100 parts of bentonite into 100 parts of the molten nitro-phenol, cooling the melt to solidify it and comminuting the solid cake thus obtained. This product is essentially a solid suspension of bentonite dispersed in the nitro-phenol, and when suspended in water, the particles of the product swell

and disintegrate, due to the water absorption by the bentonite component and this action causes the nitro-phenol component to be dispersed in the aqueous medium in an extremely finely divided form.

It should also be mentioned that bentonite and fuller's earth have been used as binders in moulded compositions, but they are used in the present case not as binders but as disrupting or disintegrating agents in compositions which will bind together without the use of a binder under the pressure employed to mould the tablets, pellets or briquettes.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In the production of compressed tablets, pellets or briquettes from powdery or granular materials suitable for subsequent dissolution or dispersion in a liquid medium, admixing a small proportion of bentonite or fuller's earth as a disintegrating agent before the materials are compressed by the application of pressure.

2. A process according to claim 1 in which about 5 per cent by weight of bentonite is used.

3. A process according to claim 1 in

which about $7\frac{1}{2}$ per cent by weight of fuller's earth is used.

4. A tablet, pellet or briquette produced in accordance with any preceding claim.

5. A tablet, pellet or briquette according to claim 4 comprising mainly silver zeolite, together with small proportions of silver oxide, an alkaline earth compound, and bentonite or fuller's earth.

6. A tablet, pellet or briquette substantially of the composition specified in either of the examples herein set forth.

Dated the 22nd day of October, 1943.

H. K. WARR-LANGTON,
Agent for the Applicant.

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